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import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from keras.utils import np_utils
from tensorflow.keras.datasets import mnist
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, Dense, Flatten
from tensorflow.keras.optimizers import Adam
from tensorflow.keras.models import load_model
from PIL import Image, ImageOps
import numpy

[ ] [(X_train, y_train), (X_test, y_test)] = mnist.load_data()

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NameError                                Traceback (most recent call last)
<ipython-input-1-5d83155269c5> in <module>
----> 1 (X_train, y_train), (X_test, y_test) = mnist.load_data()

NameError: name 'mnist' is not defined

SEARCH STACK OVERFLOW

[ ] print(X_train.shape)
    print(X_test.shape)
```

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[ ]
[ [ 0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 30, 36, 94, 154, 170,
    253, 253, 253, 253, 253, 225, 172, 253, 242, 195, 64, 0, 0,
    0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 49, 238, 253, 253, 253, 253,
    253, 253, 253, 253, 251, 93, 82, 82, 56, 39, 0, 0, 0,
    0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 18, 219, 253, 253, 253, 253,
    253, 198, 182, 247, 241, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 80, 156, 107, 253, 253,
    205, 11, 0, 43, 154, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 14, 1, 154, 253,
    90, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 139, 253,
    190, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 11, 190,
    253, 70, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 35,
    241, 225, 160, 108, 1, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
    81, 240, 253, 253, 119, 25, 0, 0, 0, 0, 0, 0, 0,
    0, 0],
  [ 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 45, 186, 253, 253, 150, 27, 0, 0, 0, 0, 0, 0,
    0, 0]
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[ ] number_of_classes = 10
Y_train = np_utils.to_categorical(y_train, number_of_classes)
Y_test = np_utils.to_categorical(y_test, number_of_classes)

[ ] Y_train[0]

array([0., 0., 0., 0., 0., 1., 0., 0., 0., 0.], dtype=float32)

[ ] model = Sequential()
model.add(Conv2D(64, (3, 3), input_shape=(28, 28, 1), activation="relu"))
model.add(Conv2D(32, (3, 3), activation="relu"))
model.add(Flatten())
model.add(Dense(number_of_classes, activation="softmax"))

[ ] model.compile(loss='categorical_crossentropy', optimizer="Adam", metrics=["accuracy"])







[ ] model.fit(X_train, Y_train, batch_size=32, epochs=5, validation_data=(X_test, Y_test))

Epoch 1/5
1875/1875 [=====] - 197s 104ms/step - loss: 0.2380 - accuracy: 0.9491 - val_loss: 0.1180 - val_accuracy: 0.9636
Epoch 2/5
1875/1875 [=====] - 206s 110ms/step - loss: 0.0689 - accuracy: 0.9791 - val_loss: 0.0746 - val_accuracy: 0.9771
Epoch 3/5
1875/1875 [=====] - 202s 108ms/step - loss: 0.0505 - accuracy: 0.9843 - val_loss: 0.0837 - val_accuracy: 0.9779
Epoch 4/5
1875/1875 [=====] - 208s 111ms/step - loss: 0.0368 - accuracy: 0.9889 - val_loss: 0.0900 - val_accuracy: 0.9771
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